511180

ESTI

EIROforum European Science Teachers Initiative

SPECIFIC SUPPORT ACTION

PRIORITY 4.3.4.3 (a)

Publishable Final Activity Report

Period covered: from 01-11-04 to 31-10-08 | Date of preparation: 23-07-10

Start date of project: 01-11-04 | Duration: 48 months

Project coordinator: R. Elaerts / F. Emma
Project coordinator organisation: ESA | Revision 1

Contents

Section 1 – Project Execution

1.1 Project Structure

The ESTI project comprised three main activities as follows:

- The execution of two international Science on Stage Science teaching festivals, with associated national and international activities, covering approximately 30 countries.
- The establishment of the European 'Science in School' science education journal, published on a quarterly basis.
- The development of educational resources related to modern biology under the Volvox project.

The first two activities were carried out by the EIROforum consortium of research organisations. The third activity was carried out by another consortium under a subcontract between the contract coordinator (ESA) and the University of Reading. For practical reasons, each consortium submitted its own activity and management reports. This final activity report deals primarily with the Science on Stage and Science in School activities.

1.2 Project Objectives

The Science on Stage and Science in School activities had three shared objectives:

- To rekindle teachers' excitement in science through major, high-profile festivals, new opportunities for training, and new mechanisms to exchange the best teaching practices across national and disciplinary boundaries; to give them valuable new teaching resources based on cutting-edge science.
- To create unique new opportunities for European scientists to participate in education-related events and to acquire didactic skills.
- To identify and monitor trends related to the current crisis in the choice of scientific careers and scientific literacy observed in Europe.

The Volvox project aimed to help to enliven school biology teaching, so that more young Europeans will continue to study biological science, follow scientific careers and, as engaged citizens, help to shape Europe's scientific culture and economy. To achieve its aims, Volvox aimed to:

- Implement mechanisms to help teachers, scientists and others develop, exchange, translate and adapt resources for biology teaching;
- Identify barriers that prevent the exchange of new and novel ideas between those with a professional interest in bioscience education;
- Investigate practical means of enhancing the uptake of new and novel ideas by European biology teachers;
- Investigate ways in which such innovation networks can be expanded to create a 'critical mass' and so become sustainable.

1.3 Contractors Involved

The ESTI project was carried out as part of the NUCLEUS cluster of activities, by the Education representatives of the EIROforum group of research organisations:

ESA – European Space Agency
CERN – European Organization for Nuclear Research
ESO – European Southern Observatory
EMBL – European Molecular Biology Laboratory
ESRF – European Synchrotron Radiation Facility
ILL – Institut Laue Langevin

The seventh EIROforum partner, EFDA – European Fusion Development Agency, also collaborated in the ESTI activities, but was not a formal contractor.

The Volvox activities were subcontracted to another consortium of organisations, coordinated by the University of Reading. The consortium consisted of:

Association of Danish Biologists (FaDB), Denmark
The Max-Planck-Gymnasium, München, Germany
University of Tartu, Estonia
COINOR, the University of Naples, Italy
University of Padova, Italy
The European School, Luxembourg
Science Festival School, International Institute of Molecular and Cell Biology, Poland
Ciência Viva, National Agency for Scientific and Technological Culture, Portugal
Göteborg University, Sweden
The National Centre for Biotechnology Education (NCBE), University of Reading, UK

Coordinator contact details

Francesco Emma
Education Office (LEX-E)
ESTEC
European Space Agency
Postbus 299
2200AG Noordwijk
THE NETHERLANDS

Tel: +31 71 565 6565
Fax: +31 71 565 5590
Email: Francesco.Emma@esa.int

1.4 Work Performed and End Results

1.4.1 Science on Stage

Two series of national and international events for science teachers took place under the Science on Stage title. The first international festival took place between 21-25 November 2005 at CERN in Geneva, Switzerland and the second between 2-6 April 2007 in Grenoble, France.

The participants to the festivals were selected through national competitions and events in 29 European countries[1], during which many thousands of science teachers and school pupils exchanged their ideas and demonstrated their projects. The most inspiring contributions were selected and sponsored to attend the internationals festivals, twice bringing together 450 science

[1] The countries included all European Member States of the EIROforum organisations: Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

teachers and education professionals with around 50 scientists and other staff of the EIROforum organisations.

The activities were coordinated by the ESTI consortium members, but largely driven by National Steering Committees (NSCs) involving members of the national science education systems. The central tasks of the NSCs were to promote the Science on Stage project and to identify novel projects and outstanding teachers in science education, for participation in the Science on Stage international festivals. ESA took the leading role in coordinating the national activities and liaising with the festival organisers, respectively CERN and ESRF/ILL.

A subsidy of €5000 was twice made available to each NSC as support for the national activities, which had to be matched by an equal or greater sum, raised through national sponsorship. In order to qualify for this, the NSC had to submit a national plan and budget for ISC approval and launch a national Science on Stage website. Some countries were particularly successful in attracting media coverage of the project and several of the events were attended by VIPs from the national education ministries.

Out of the many innovative means and methods for science teaching discovered by the NSCs, the top-ranking proposals were put forward to the ISC as potential workshops and on-stage activities for the programme of the international Science on Stage festivals.

These two major festivals followed a similar template to the three Physics on Stage festivals, carried out between 2000 and 2003. Each event lasted for five days and revolved around a large and diverse science teaching fair; a big marketplace where every country had a booth and teachers could spend each afternoon showing their experiments and projects and being inspired by their colleagues.

In addition, participants met in workshops to discuss trends in science teaching, to learn more about current research topics or to exchange ideas for school projects, and also attended performances and presentations that approached science from a theatrical, artistic point of view.

A major highlight of the Science on Stage 2 festival was the Round Table discussion, entitled "Science Education in the Age of the Knowledge Society - Strengthening Science Education in Europe". In addition to the European Commissioner for Science and Research, Janez Potočnik, the panellists included the Danish Minister for Education, Bertel Haarder; the MEP Vittorio Prodi; the Chair of the UK's Engineering and Physical Sciences Research Council, Julia Higgins; the Hungarian Secretary of State for Education and Culture, Gergely Arató; the Director General of the European Southern Observatory, Catherine Cesarsky; and the Director of the Institut Laue Langevin, Richard Wagner.

Each festival closed with the presentation of the European Science Teaching Awards to winners selected by a jury from all those present at the festival. These awards comprised 4 money prizes (€4000-€1000) and 7 prizes sponsored by the EIROforum research organisations, plus one €1000 prize sponsored by the European Physical Society.

Following on from each festival, there were several publications of teaching material, workshop discussions and ideas from the fair, in hard copy, online and video format. The majority of this is now archived on the Science on Stage website (see section 1.6) and covers a whole variety of approaches to teaching science in schools, for example: workshops, exercises, team work, experiments, lesson plans and lectures. Many highlights have also been covered in the Science in School journal.

Following the festivals, several NSCs held follow-up events to allow participating teachers to share what they had learned with other teachers who did not attend the festival. Many countries received high-level support for their activities and plan to continue them even after the end of the ESTI project.

1.4.2 Science in School

With Science in School, EIROforum has succeeded in establishing a high quality and popular journal, which addresses science teaching both across Europe and across disciplines: highlighting the best in teaching and cutting-edge research. It covers not only biology, physics and chemistry, but also earth sciences, engineering and medicine, focusing on interdisciplinary work.

The official launch of Science in School took place at EMBL in Heidelberg, Germany, on 28 March 2006. A reception took place at EMBL in Heidelberg, with presentations given by representatives from the European Commission and EIROforum. Both the printed and online copies of issue 1 were available by this date.

Ten issues have been planned and published throughout the duration of the ESTI contract. The contents include teaching materials; cutting-edge science; important science topics, projects in science education; interviews with inspiring scientists and teachers; reviews of books and other resources; and European events for teachers and schools, and many other useful resources for science teachers.

Science in School is published quarterly and is available free online; free print copies in English are distributed across Europe and many articles have been translated by volunteers and made available on the project website.

EMBL has overall responsibility for the production and distribution of Science in School. The other EIROforum organisations participate in the Editorial Board and submit articles and other suggestions for content. In addition to the Editorial Board, there is a Teachers' Panel which reviews articles before publication.

In summary, the objectives of the ESTI project have been reached and in many respects exceeded. The activities demonstrate EIROforum's commitment to identifying and facilitating the exchange of high quality science educational material and for training the next generation of researchers.

1.5 Impact of the Project

1.5.1 Science on Stage

Independent evaluation of the Science on Stage activities found that, "the events were felt by most teachers to be an extremely valuable and rewarding initiative. The level of enthusiasm at the event was an inspiration for many. The range of ideas shared amongst teachers was beneficial and, for many, was unavailable through any other initiative."

"Even up to six months after the teaching festival, the impact of Science on Stage continues to be evident and positive. The internet survey and case study visits indicated that many teachers have used the resources and ideas collected at the event for their own teaching. Most teachers explained that it provided them with a real impetus to teach science more creatively and helped them consider the importance of engaging students through their teaching."[2].

The fact that several countries have maintained the momentum of their activities beyond the end of the ESTI contract and attracted funding to organise other national and even international Science on Stage events is the ultimate validation of the concept. The legacy of the project and strong links made between European teachers and scientists will continue to benefit science teachers and students for many years to come.

[2] Extracts from Science on Stage Evaluation Report by EdComs, February 2008

1.5.2 Science in School

Science in School has become well established among the science teaching community of Europe, with a steadily rising number of subscriptions and distribution partners. Bulk distribution of each issue varies between 16 000 and 22 000 copies, depending on what relevant conferences and other events are happening. The journals are distributed across Europe, in up to 38 countries and the website receives an average of 50 000 page views per month from across the world.

Most Science in School readers are secondary-school science teachers, but the readership also includes a significant number of scientists, teacher trainers, science communicators and primary-school teachers. The majority of readers come from the fields of physics, biology and chemistry, with smaller numbers involved in maths and earth sciences.

An independent, external evaluation in January 2008 by specialist education evaluators, EdComs, showed that readers found the journal motivating and relevant to school, and that they use the journal contents in their teaching. They appreciated the range of topics, as well as the simple and interesting way that *Science in School* explains complex science. Furthermore, the external evaluation demonstrated that *Science in School* enhances the image of EIROforum, the EIROs and their individual or joint outreach activities.

1.6 Conclusion

The original intentions of the project, as copied below, are considered to have been met or exceeded:

"It is estimated that approximately 4000 teachers per year will be directly involved as active participants in ESTI activities, e.g. by taking part in the national activities or in the international Science on Stage festival, by subscribing to the Science in School journal, or by engaging with the material and discussions on the Volvox website.

The Science in School journal and the various project websites listed below will serve as tools to bring all of the products and expertise that are created or identified during the project to the attention of thousands of science teachers across Europe.

A key aspect of the Volvox activities is to provide a dynamic forum for the exchange of creative ideas and good educational practice across the EU, whereby information will be fed back into the project to increase the value of all newly-created teaching materials.

These methods will raise the real impact of the activities significantly, because:

- active participants will serve as multipliers in the teaching community;
- much larger numbers of teachers will be able to exploit the practical outcomes;
- scientists will have many new opportunities to become engaged in teaching and communication activities;

The intention is thus to create strong and lasting links between teaching and contemporary science."

1.7 Supporting Information

Project logos

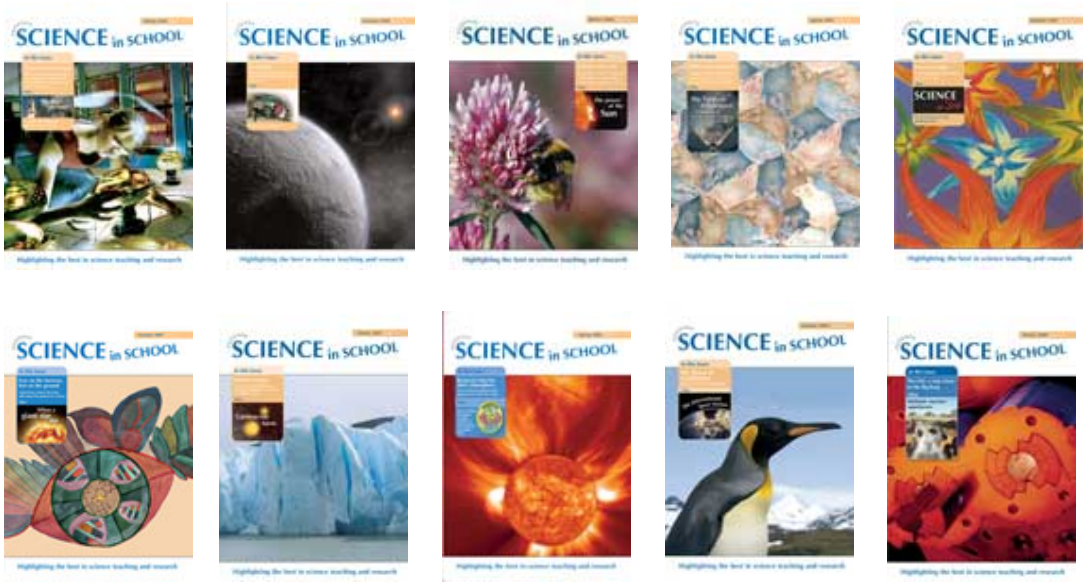
Science on Stage logo *Volvox logo* *NUCLEUS logo*

Science in School logo

Project websites

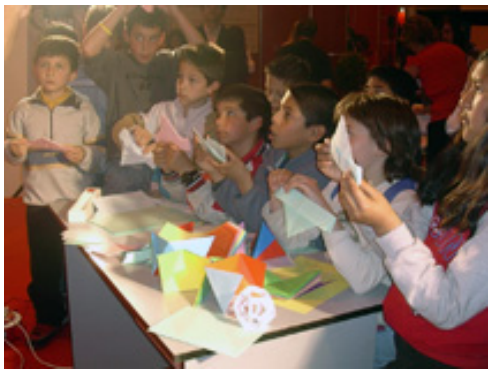
Science on Stage	www.scienceonstage.net
Science in School Journal	www.scienceinschool.org
Volvox	www.eurovolvox.org
NUCLEUS European Science Education Portal (ESEP)	www.xplora.org

Science in School covers, issues 1-10



Science on Stage national activities

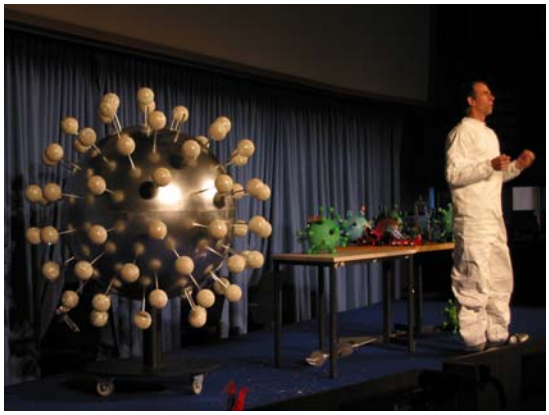
EuroPhysicsFun show at the 'Teaching Science in Europe' conference in Wolfsburg, Germany



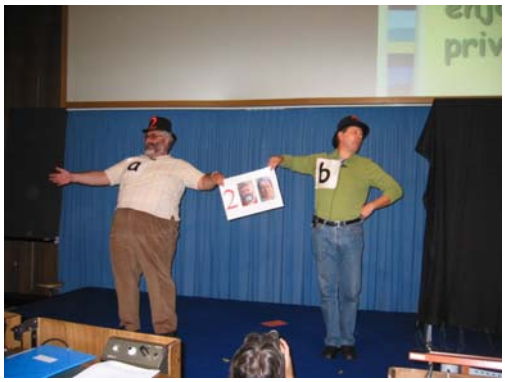
Children at the 'Ciencia en Acción' event in Madrid, Spain

Science on Stage festival

A team of students present their project at the Austrian fair stand

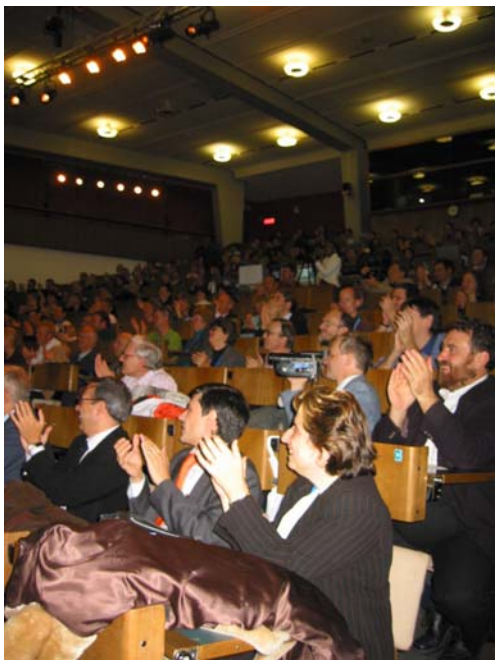


Performance of the 'HIV Biochemistry Show'



Performance of 'Stacks of Maths' by two Spanish teachers

One of the 39 workshops which took place during the festival



An appreciative audience in the auditorium

The European Science Teaching Awards

Section 2 – Dissemination and Use

Dates	Type	Type of audience	Countries addressed	Size of audience	Partner respon-sible /involved
Mar 2005	Science and Society Forum, Brussels	Policy makers, journalists, science communicators	30	900	All
Mar 2005	Science on Stage project website	Science education stakeholders	30	4 000	ESA
Mar 2005	Science on Stage 1 poster and flyer	Science education stakeholders	30	20 000	ESA
Oct 2005	Science in School journal flyer	Science education stakeholders	30	2 000	EMBL
Oct 2005	ECIS conference www.ecis.org	Teachers from international schools	worldwide	3 000	ESA, CERN
Oct 2005	Science on Stage 1 festival website	Science education stakeholders	30	1 000	CERN
Nov 2005	Press release about festival	General public	30	30 000+	ESO
Nov 2005	Science on Stage 1 abstract book	Festival participants	30	500	ESA
	Science in School website	Science education stakeholders	30	5 000	EMBL
Mar 2006	Press release about Science in School launch	General public	30	30 000+	EMBL
Jan 2006	Science on Stage 2 poster and flyer	Science education stakeholders	30	20 000	ESA
Mar 2006	Science in School issue 1	Science education stakeholders	30	17 000	EMBL
Apr 2006	Science on Stage 1 festival highlights video	Festival participants	30	500	ESO
Jul 2006	EuroScience Open Forum (ESOF) 2006, Munich www.esof2006.org	Scientists, journalists, general public	30	2 000	All
Aug 2006	Science in School issue 2	Science education stakeholders	30	20 000	EMBL
Nov 2006	Science on Stage 2 festival website	Science education stakeholders	30	1 000	ESRF
Dec 2006	Science in School issue 3	Science education stakeholders	30	30 000	EMBL
tbc	Special issue of RTD info	Policy makers, journalists, science communicators	worldwide	tbc	All
Nov 2006	Science on Stage 2 festival website	Science education stakeholders	30	1 000	ESRF
Mar 2007	Press release about festival	General public	30	30 000+	ESO
Mar 2007	Science in School issue 4	Science education stakeholders	30	30 000	EMBL
Apr 2007	Science on Stage 2 abstract book	Festival participants	30	500	ESA
Jun 2007	Science in School issue 5	Science education stakeholders	30	30 000	EMBL

Dates	Type	Type of audience	Countries addressed	Size of audience	Partner respon-sible /involved
Sep 2007	Science on Stage 2 festival highlights material & videos	Website visitors	30	10 000	ESA
Sep 2007	Science in School issue 6	Science education stakeholders	30	30 000	EMBL
Dec 2007	Science in School issue 7	Science education stakeholders	30	30 000	EMBL
Apr 2008	Science in School issue 8	Science education stakeholders	30	30 000	EMBL
Jul 2008	EuroScience Open Forum (ESOF) 2008, Barcelona www.esof2008.org	Scientists, journalists, general public	30	2 000	All
Sep 2008	Science in School issue 9	Science education stakeholders	30	30 000	EMBL
Dec 2008	Science in School issue 10	Science education stakeholders	30	30 000	EMBL